

- It appears that many early (that is, pre-1992) P2 efforts were not recorded formally. Therefore, establishment of a “baseline” description of P2 efforts is extremely difficult.

8.0 UTC’s RECOMMENDATIONS FOR COMPLIANCE ASSISTANCE

The corporate EMS survey solicited recommendations from UTC about possible approaches to compliance assistance. Those recommendations are set forth below.

- UTC suggested that EPA and the states replace their current (administrative) systems with performance-based systems.
- UTC indicated a desire for more consistency on the part of EPA and the states in interpreting environmental regulations.
- UTC indicated that priorities should be established for the use of federal and state government and industry resources related to compliance, according to the risk that particular operations pose to human health and the environment.
- UTC suggested that more detail accompany notices of violation (NOV) to aid a facility in taking corrective actions; UTC stated that recommendations from the regulatory agencies (that is, examples of compliant approaches at other facilities) would be helpful.
- UTC encouraged more familiarity among EPA and state regulators with facility operations and more communication between facilities and EPA and state regulators.

9.0 COMPARISONS TO THE RCA PROJECT

This section provides a comparison of the findings of this project with the EPA/CMA Root Cause Analysis Pilot Project (RCA project). As was previously noted, this project used a methodology very similar to that developed for the RCA Project. Particularly as this is the first effort to build on the work of that study, it is useful to evaluate how the findings of this effort compare with those of the RCA project. The subsections below include (1) a comparison of the RCA Project noncompliance and root cause categories with the UTC 1998 survey results and (2)

a comparison of the corrective actions as reported in the RCA Project and the UTC 1998 survey results.

This report compares the RCA project findings with the 1998, post-EMS UTC findings for two reasons. First, the RCA project covered six statutes – the same five with findings in the 1998 UTC audit plus TSCA findings – so the 1998 UTC data, which also covered six statutes, are a closer match. Second, the RCA project report found “widespread implementation of EMS elements at the time of noncompliance” among covered CMA member companies (RCA project page 29). Therefore, in terms of EMS implementation, the data from the UTC study in 1998 are more comparable to the CMA project than the 1990 data from the UTC study.

9.1 Comparison of Noncompliance and Root Cause Categories for the CMA RCA Project and the UTC EMS Study

In terms of noncompliance categories, the same four categories dominated in both the 1998 UTC survey and in the RCA project:

<u>UTC 1998</u>		<u>CMA RCA</u> (from page 11 of the report)	
Recordkeeping	(27%)	Reporting	(29%)
Reporting	(21%)	Exceedence	(10%)
Operations		Operations	
& Maintenance	(18%)	& Maintenance	(10%)
Exceedences	(17%)	Recordkeeping	(10%)

Even more striking, the same three root causes were observed, in the same order, in both studies: **Regulations and Permits**, followed by **Human Error**, followed by **Procedures**. Two of three leading contributing causes were the same in both studies: **Regulations and Permits** and **Management** (see pages 22-23 of the RCA report).

The degree of concordance between these findings tends to increase the likelihood that both are relatively accurate reflections of reality. It also suggests that these noncompliance categories,

and cause categories, are worthy of particular attention by companies that have already implemented EMS. The RCA report recommends that companies ensure that all EMS elements are in place, establish accurate, standard operating procedures, and conduct employee training and other activities to increase awareness of and commitment to the EMS and operating procedures (see RCA report page 42). This report generally echoes and supplements the recommendations of the RCA project, and refines them by focusing on the need to ensure that environmental aspects are identified, that operating procedures are followed, that appropriate staff are assigned to jobs, and that EMS are updated to reflect newly arising requirements such as stormwater rules.

Importantly, the fact that **Regulations and Permits** was the dominant root cause in both studies reinforces the RCA report's recommendations (from page 42) that federal and state regulators articulate new regulations more clearly, work with each other to coordinate interpretations of those rules, and increase their compliance assistance and outreach activities. Both UTC and the CMA recommended in the surveys that EPA work with state agencies to ensure that regulations are interpreted consistently.

9.2 Comparison of Corrective Actions for CMA RCA Project and UTC EMS Study

Further similarities are found between the 1998 UTC survey and the CMA RCA project in the area of corrective actions that were taken as a result of the noncompliance found. The surveys completed by participants in both projects included information on corrective actions taken, however, data provided from UTC facilities on corrective actions taken in the 1990 timeframe provided insufficient particulars to do a detailed comparison using earlier data. However, detailed information was available for corrective actions in the post-EMS surveys and it is helpful to compare the results with those from the RCA Project.

The corrective actions for the post-EMS surveys in the UTC EMS Study were grouped into categories similar to those used in the RCA project to allow for comparison of the data, as shown

below. In the RCA project, the types of corrective actions were divided into those that are viewed almost universally as integral parts of an EMS and those that are not. In the information presented below, the corrective action categories not deemed to be fundamental parts of an EMS are shown in italics.

UTC 1998

Changes in Procedures/Polices (36%)
 Additional Training (20%)
Changes to Equipment (19%)
 Communications (8%)
 Management Aspects (7%)
 Change Compliance Monitoring/Auditing (6%)
Regulations/Permits (3%)

CMA RCA Project (from pages 31 and 32)

Changes in Procedures/Policies (44%)
Changes to Equipment (22%)
 Additional Training (12%)
 Change Compliance Monitoring/Auditing (9%)
Regulations/Permits (7%)
 Management Aspects (4%)
 Communications (2%)

The modification of Procedures and Policies was the most frequently cited type of corrective action for both UTC and the CMA members and the top three changes made were the same for both studies. Modifications of procedures or policies along with changes to equipment and additional training, accounted for a significant majority of corrective actions, totaling 75 percent and 78 percent in the 1998-UTC and CMA studies, respectively.

The data show that in both studies, the majority of the corrective actions taken were relevant to an EMS (78 percent for the UTC study and 71 percent for the CMA RCA Project) such as commitment on the part of management clearly communicated procedures, auditing, and training. This finding supports the conclusion that an EMS can provide approaches to address noncompliance and that as an EMS matures, facilities may need to focus on the more intractable categories of root causes by ensuring both that policies and procedures reflect actual operational needs and that procedures and training keep pace with changing requirements and regulations.